

# Activity Level and Risk of Overweight in Male Health Professionals

## ABSTRACT

**Objectives.** This study undertook to examine relationships between nonsedentary activity level, time spent watching television (TV)/videocassette recorder (VCR), and risk of overweight among men.

**Methods.** Men participating in the Health Professionals Follow-Up Study were mailed surveys. Cross-sectional analyses examined the prevalence and odds of being overweight; prospective analyses determined cumulative incidence rates and relative risks of becoming overweight over 2 years of follow-up.

**Results.** Cross-sectionally, odds of being overweight were 50% (95% confidence interval [CI] = 45%, 55%) lower for men in the highest quintile of nonsedentary activity level when compared with men in the lowest quintile. Among men watching 41 or more hours of TV/VCR per week, the odds of being overweight were 4.06 (95% CI = 2.67, 6.17) times greater than those for men watching no more than 1 hour per week. Prospectively, higher levels of nonsedentary activity and lower levels of TV/VCR viewing were independently associated with lower relative risks for becoming overweight between survey years.

**Conclusions.** Both a lack of nonsedentary activity and time spent watching TV/VCR contribute to the development of overweight in men. Sedentary and nonsedentary activities represent separate domains, each with independent risks for overweight. (*Am J Public Health.* 1996;86:25-30)

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## Introduction

National surveys indicate that the US male population is becoming increasingly overweight. Among men 20 to 74 years of age, the prevalence of overweight has increased from 23.2% in the National Health Examination Surveys of 1960-1962 to 31.3% in the National Health and Nutrition Examination Surveys of 1988-1991 (NHANES III, phase 1).<sup>1,2</sup>

One approach to the prevention and treatment of overweight is to increase energy expenditure through regular physical activity. Physical conditioning reduces fat mass and total body weight, increases lean body weight, and is associated with weight control independent of dietary factors.<sup>3-9</sup> Exercise improves cardiorespiratory functional capacity and decreases serum lipid, glucose, and insulin levels.<sup>9-12</sup>

Although the relationship between moderate or vigorous physical activity and overweight has been examined in several studies, less attention has focused on sedentary behaviors and risk of overweight. Nearly 60% of the US adult population reports engaging in little or no leisure-time physical activity.<sup>13</sup> Inactivity is associated with reduced levels of lean body mass and increased body fat in adults, and with obesity in children and adolescents in the United States.<sup>14-16</sup> Watching television (TV) represents a major sedentary behavior; the average adult male watches more than 29 hours weekly.<sup>17</sup> Several cross-sectional studies have reported an association between TV viewing and obesity in adults,<sup>18-20</sup> but prospective data exist only for children.<sup>21</sup>

In the current study, we examined cross-sectional and prospective relationships between nonsedentary and sedentary activity levels and risk of overweight

in a cohort of male health professionals surveyed in 1988 and 1990.

## Methods

### Study Sample

The Health Professionals Follow-Up Study has been described elsewhere.<sup>22-24</sup> Briefly, it is a longitudinal study that examines various lifestyle risk factors for cardiovascular disease, cancer, and other health and disease outcomes among a cohort of US male health professionals. In 1986, 51 529 male health professionals, 40 to 75 years of age, were enrolled in the study. The cohort consists of dentists (58%), veterinarians (20%), pharmacists (8%), optometrists (7%), osteopaths (4%), and podiatrists (3%) who completed a six-page baseline questionnaire in 1986 concerning their medical history, current diet, and other lifestyle habits, including physical activity patterns. Follow-up questionnaires were sent every 2 years to update information on health status parameters and health practices, including patterns of nonsedentary and sedentary activity. This analysis begins with the 1988 questionnaire because that was the first

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year in which information concerning sedentary activity level was collected.

Because our interest was in the activity-overweight relationship in healthy men, approximately 19% of the cohort with diseases that could alter activity level and/or weight were excluded from the analyses. These diseases included heart disease, stroke, arterial diseases of the leg, renal disease, cancer, and "other major illnesses" reported. Approximately 17% of the men who did not provide information concerning physical activity, height, weight, age, or smoking status were also excluded from the analyses, as were approximately 2% of the men for whom a reporting error was suspected. These were men who reported a nonsedentary activity level representing an energy expenditure exceeding 1000 calories per day, which is equivalent to running 11 miles, jogging 13 miles, or walking 14 miles *daily*. Men with a calculated body mass index below 19.4, the 5th percentile of body mass index for the reference population in NHANES II, were also excluded<sup>25</sup>; these were men who might have misreported their height or weight or who might have been underweight owing to chronic illnesses. The cohort for cross-sectional analyses thus included 22 076 healthy men who provided complete responses to follow-up questionnaires in 1988 and 1990. Men with a body mass index of at least 27.8 in 1988 ( $n = 4281$ ) were considered already overweight and so were excluded from prospective analyses that focused on evaluating risk for becoming overweight by 1990.

### Variables of Interest

Self-reported body weight (in pounds) and height (in inches) were converted to kilograms and meters and used to calculate body mass index ( $\text{weight}/\text{height}^2$ ) for each survey year. The 85th percentile from the NHANES II survey<sup>25</sup> was used to classify as overweight cohort members with a body mass index of 27.8  $\text{kg}/\text{m}^2$  or greater.

Nonsedentary activity level was assessed using a question derived from the Harvard Alumni Survey.<sup>26</sup> Respondents indicated the average amount of time they spent per week over the past year engaged in nine activities (walking or hiking, jogging, running, bicycling, lap swimming, playing tennis, playing squash or racquetball, performing calisthenics or rowing, and doing heavy outdoor work). The number of flights of stairs they climbed each week was also included in the determination of their nonsedentary activity level.

Time spent in each of the activities was multiplied by the average metabolic equivalent (MET) specific to each activity. Metabolic equivalents represent the ratio of energy expended during each specific activity relative to resting metabolic rate and are independent of body weight.<sup>27-29</sup> The more vigorous the activity, the more METs are attributed to it. Total weekly MET hours, a measure reflecting both the relative intensity and the time spent in all nonsedentary activities, were determined for each individual by summing all reported activities. The range of MET hours represented in the entire cohort was then divided into quintiles. For simplicity, MET hours are referred to as METS in the remainder of this paper.

Self-reported hours of TV/videocassette recorder (VCR) viewing each week was the indicator of sedentary activity level. Six time categories (0 to 1 hour; 2 to 5 hours, 6 to 10 hours, 11 to 20 hours, 21 to 40 hours, and 41 or more hours) were used.

### Statistical Analyses

Multiple logistic regression models with indicator variables for each quintile of METS and for time spent watching TV/VCR were used to estimate odds ratios (ORs), which were interpreted as relative risks (RRs) when cumulative incidence rates were less than 10%. Cross-sectional analyses examined the relationships between those two variables and the prevalence and odds of being overweight in 1988. Prospective analyses evaluated the relationships between those two variables in 1988, and the cumulative incidence and relative risk of new onset of overweight between 1988 and 1990 among the 17 795 men who were not overweight in 1988. Odds ratios and relative risks were estimated using the lowest quintile of METS or time category of TV viewing as the reference category.<sup>30</sup> Significant monotonic trends were tested for by assigning each participant the median METS value of each quintile. Testing for an interactive effect between nonsedentary and sedentary activity level was evaluated with a log-likelihood ratio chi-square test.<sup>31,32</sup> To examine further the relationship between activity level and body mass index, change in METS expended in nonsedentary activity per week and change in weekly TV/VCR viewing hours between 1988 and 1990 were considered as continuous variables and entered as separate terms into linear regression models, with change in body mass index between survey years used as the dependent variable.

All analyses were adjusted for age and smoking status (nonsmoker or current smoker since less than 15% of the cohort were current smokers).

### Results

The mean age of the cohort in 1988 was  $54.1 \pm 9.3$  years, with a range of 41 to 78 years. Eighty-six percent of the cohort were nonsmokers. The age-adjusted mean body mass index in 1988 ( $25.6 \pm 3.1$ ) was similar to the mean body mass index in 1990 ( $25.7 \pm 3.2$ ). The prevalence of overweight (body mass index  $\geq 27.8$ ) among the cohort was 19.4%, nearly 12% lower than the average national prevalence of overweight among men surveyed in the first phase of NHANES III.<sup>2</sup> The average weekly nonsedentary activity level represented by METS in 1988 was  $24.8 \pm 21.8$ , a level of activity equivalent to walking briskly or playing tennis 4 hours per week. However, the large standard deviation in METS indicated that the cohort varied greatly in its nonsedentary activity level. On average, cohort members spent  $11.3 \pm 8.5$  hours per week watching TV/VCR in 1988, with the majority of men watching less than 10 hours per week.

### Cross-Sectional Analyses

Age- and smoking-adjusted prevalence rates and odds ratios for overweight decreased as the nonsedentary activity level increased (Table 1). Men in the highest quintile of METS had lower odds of being overweight (OR = 0.50; 95% confidence interval [CI] = 0.45, 0.55) than men in the lowest quintile. Even men in the second and third quintiles with light to moderate levels of nonsedentary activity had reduced odds of being overweight relative to men in the lowest quintile of activity. In contrast, increasing time spent watching TV/VCR was associated with increased prevalence and odds ratios for overweight. Men who watched 41 or more hours of TV per week had higher odds of being overweight (OR = 4.06; 95% CI = 2.67, 6.17) than men watching 1 hour or less per week. Even men watching only 2 to 5 hours per week had increased odds of being overweight (OR = 1.42; 95% CI = 1.14, 1.77) when compared with men watching the least amount.

To determine if nonsedentary and sedentary activity levels had independent relationships with the prevalence and odds of being overweight, logistic regression models with terms for METS (for nonsedentary activity) and time spent

watching TV/VCR were evaluated in age- and smoking-adjusted models. Odds ratios for overweight did not change from the age- and smoking-adjusted models when the nonsedentary activity level was adjusted for time spent watching TV/VCR. Similarly, adjustment for the nonsedentary activity had little impact on the odds ratios for overweight associated with increasing time spent watching TV/VCR.

To evaluate the association between the joint classification of nonsedentary and sedentary activity levels and the odds of being overweight, quintiles of METS were retained but the TV/VCR viewing time categories were collapsed from 6 to 4 to give stability to the categories. The time categories now represented watching TV/VCR for zero to 5 hours per week, 6 to 10 hours per week, 11 to 20 hours per week, and 21 or more hours per week. Men in the highest quintile of METS and lowest time category of TV/VCR viewing were considered the most active men and served as the reference group. In comparing men in the most extreme categories of combined activity level, men with the lowest nonsedentary activity level and highest TV/VCR viewing (considered the most sedentary men) had odds of being overweight that were more than three times the odds for the most active men (Figure 1). Overall, within each quintile of METS, greater amounts of TV/VCR watching were associated with higher odds of being overweight, and at each level of TV/VCR viewing, the increasing nonsedentary activity level was generally associated with lower odds of being overweight. These trends suggest that no interaction was occurring between the nonsedentary and sedentary activity levels. A formal test for interaction was not statistically significant ( $\chi^2$  with 1 *df* = 3.0;  $P > .05$ ).

### Prospective Analyses

Among the 17 795 cohort members who were not overweight at the start of follow-up, the cumulative incidence of overweight between 1988 and 1990 was 4.6%. We found an inverse association ( $P$  for trend  $\leq .01$ ) between METS expended in nonsedentary activity and risk of becoming overweight by 1990 (Table 2). Compared with men in the lowest quintile of METS, men in the highest quintile had an age- and smoking-adjusted relative risk of 0.79 (95% CI = 0.64, 0.99;  $P$  for trend = .01) for becoming overweight by 1990. Men in the third and fourth quintiles of nonsedentary activity level had similar relative risks for

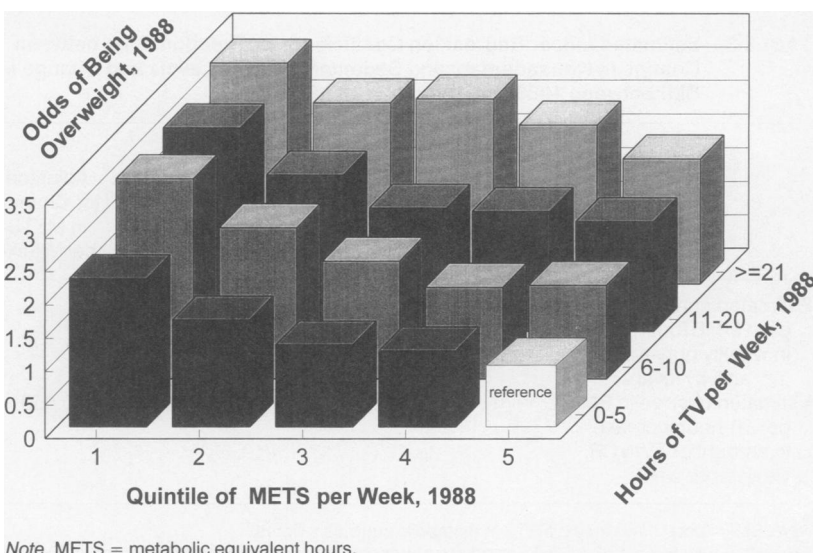
**TABLE 1—Prevalence Rates and Odds Ratios for Overweight (BMI  $\geq 27.8$ ) among Male Health Professionals, by Quintile of Nonsedentary Activity Level (METS) and Average Weekly Time Spent Watching TV/VCR**

	No. Men (n = 22 076)	Prevalence of Overweight, %	OR <sup>a</sup> (95% CI)	OR <sup>b</sup> (95% CI)
<b>1988 METS/wk</b>				
$\leq 6.3$	4370	26.5	1.00	1.00
$> 6.3$ and $\leq 13.6$	4460	21.4	0.76 (0.69, 0.84)	0.76 (0.69, 0.84)
$> 13.6$ and $\leq 23.9$	4416	17.9	0.61 (0.55, 0.67)	0.61 (0.55, 0.68)
$> 23.9$ and $\leq 41.1$	4419	16.2	0.54 (0.49, 0.60)	0.54 (0.49, 0.61)
$> 41.1$	4411	15.1	0.50 (0.45, 0.55)	0.50 (0.45, 0.56)
Test for trend in ORs			$P = .001$	$P = .001$
<b>1988 TV/VCR hrs/wk</b>				
0–1	871	11.7	1.00	1.00
2–5	5672	15.8	1.42 (1.14, 1.77)	1.43 (1.15, 1.78)
6–10	6541	19.5	1.83 (1.48, 2.27)	1.87 (1.51, 2.32)
11–20	6591	21.3	2.04 (1.65, 2.53)	2.05 (1.66, 2.55)
21–40	2272	24.5	2.47 (1.97, 3.11)	2.40 (1.91, 3.02)
41 or more	129	34.9	4.06 (2.67, 6.17)	3.88 (2.55, 5.92)
Test for trend in ORs			$P = .002$	$P = .002$

Note. BMI = body mass index; METS = metabolic equivalent hours; OR = odds ratio; CI = confidence interval. Reference categories for estimating odds ratios are overweight at the lowest level of METS and lowest level of TV/VCR viewing.

<sup>a</sup>Analyses adjusted for age (5-year categories) and smoking status (nonsmoker, current smoker).

<sup>b</sup>Analyses for 1988 METS per week adjusted for age, smoking status, and level of TV/VCR viewing; analyses for 1988 TV/VCR hours per week adjusted for age, smoking status, and quintile of nonsedentary activity level.



Note. METS = metabolic equivalent hours.

**FIGURE 1—Joint classification of quintile of METS, hours of TV/VCR viewed, and odds of being overweight among male health professionals, 1988.**

becoming overweight, indicating that even moderate activity was associated with reduced risk. Estimated relative risks did not change appreciably when analyses were adjusted for level of TV/VCR viewing in 1988.

The cumulative incidence of overweight generally increased with increasing time spent watching TV/VCR in 1988. Although none of the estimated individual relative risks reached statistical significance, the test for trend across

**TABLE 2—Cumulative Incidence Rates and Relative Risks for Becoming Overweight between 1988 and 1990, by Quintile of Nonsedentary Activity Level (METs) and Average Weekly Time Spent Watching TV/VCR**

	No. Men (n = 17 795)	Cumulative Incidence of Overweight, %	Relative Risks <sup>a</sup> (95% CI)	Relative Risks <sup>b</sup> (95% CI)
<b>1988 METs/wk</b>				
≤ 6.9	3555	5.3	1.00	1.00
> 6.9 and ≤ 14.5	3575	5.3	1.00 (0.81, 1.23)	1.01 (0.82, 1.24)
> 14.5 and ≤ 25.3	3571	4.3	0.79 (0.63, 0.98)	0.80 (0.64, 1.00)
> 25.3 and ≤ 42.3	3534	3.8	0.72 (0.57, 0.90)	0.73 (0.58, 0.92)
> 42.3	3460	4.2	0.79 (0.64, 0.99)	0.81 (0.65, 1.01)
Test for trend in relative risks			P = .01	P = .01
<b>1988 TV/VCR hrs/wk</b>				
0–1	769	4.4	1.00	1.00
2–5	4773	4.5	1.04 (0.72, 1.51)	1.04 (0.72, 1.51)
6–10	5264	4.0	0.95 (0.65, 1.38)	0.95 (0.66, 1.38)
11–20	5190	4.9	1.19 (0.83, 1.72)	1.19 (0.82, 1.72)
21–40	1715	5.5	1.44 (1.04, 2.16)	1.41 (0.94, 2.12)
41 or more	84	6.0	1.56 (0.59, 4.11)	1.49 (0.57, 3.95)
Test for trend in relative risks			P = .001	P = .002

Note. METs = metabolic equivalent hours; CI = confidence interval. Reference categories for estimating relative risks are overweight at the lowest level of METs and lowest level of TV/VCR viewing.

<sup>a</sup>Analyses adjusted for age (5-year categories) and smoking status (nonsmoker, current smoker).

<sup>b</sup>Analyses for 1988 METs per week adjusted for age, smoking status, and level of TV/VCR viewing; analyses for 1988 TV/VCR hours per week adjusted for age, smoking status, and quintile of nonsedentary activity level.

**TABLE 3—Estimated Linear Regression Coefficients for Relationships between Change in Nonsedentary and Sedentary Activity Levels and Change in BMI between 1988 and 1990 (n = 19 361)**

	Unadjusted for Change in Hours of TV/VCR Viewed per Week <sup>a</sup>	Adjusted for Change in Hours of TV/VCR Viewed per Week <sup>a</sup>	Unadjusted for Change in METs per Week <sup>a</sup>	Adjusted for Change in METs per Week <sup>a</sup>
Estimated change in BMI per 10-MET increase in weekly nonseden- tary activity level	−0.029	−0.030	...	...
Estimated change in BMI per 10-hour increase in amount of TV/VCR viewed per week	...	...	0.051	0.059

Note. BMI = body mass index; METs = metabolic equivalent hours.

<sup>a</sup>Analyses adjusted for BMI, METs expended in nonsedentary activity in 1988, hours of TV/VCR viewed per week in 1988, age (5-year categories), and smoking status (nonsmoker, current smoker). P ≤ .0001 for estimated regression coefficients.

relative risks was statistically significant even when adjusted for age, smoking status, and level of nonsedentary activity in 1988. Men watching 21 or more hours of TV/VCR per week in 1988 were over 40% more likely to become overweight by 1990 than were men viewing 1 hour or less

per week (RR = 1.44, 95% CI = 1.04, 2.16 for those viewing 21–40 hours; RR = 1.56, 95% CI = 0.59, 4.11 for those viewing 41 or more hours; P for trend < .01). Relative risks were not substantially changed after further adjustment for level of nonsedentary activity in 1988.

To explore further the relationship between activity level and body mass index, data from 19 361 cohort members who provided complete information on body mass index, nonsedentary activity level, and level of TV/VCR viewing in 1988 and 1990 were analyzed. Changes in METs and in hours of TV/VCR viewed per week between survey years were entered into linear regression models as continuous variables, and change in body mass index was entered as the dependent variable. All analyses were adjusted for body mass index, METs, hours of TV/VCR viewed, age, and smoking status in 1988. Each 10-MET increase in the nonsedentary activity level (equivalent to running or playing squash an extra hour each week) predicted a 0.03 decrease in body mass index or approximately one fifth of a pound lost in body weight (Table 3). Each 10-hour per week increase in TV/VCR viewed predicted a 0.05 increase in body mass index or approximately one third of a pound gained in body weight between 1988 and 1990. The inclusion of changes in METs and in hours of TV/VCR viewed per week simultaneously in the linear regression model did not change the regression coefficients substantially.

## Discussion

The present study revealed associations between nonsedentary activity level and risk of overweight in both cross-sectional and prospective analyses; these associations persisted even when adjusted for age, smoking status, and level of weekly TV/VCR viewing. In addition, time spent watching TV, one measure of sedentary activity level, was related to risk of overweight independent of nonsedentary activity level. These findings suggest that both nonsedentary activity and sedentary activity, specifically TV viewing, may play independent roles in the genesis and persistence of overweight in adult men.

Within the cohort of male health professionals studied, prospective analyses indicate that expending an average of more than 14.5 METs per week in physical activity in 1988 was sufficient to achieve a lowered risk for development of overweight by 1990. This level of activity represents engaging in light to moderate activities such as brisk walking, jogging, and/or swimming for at least 30 minutes daily and is consistent with levels of activity recommended for the nation in *Healthy People 2000*.<sup>33</sup> Results from linear regression analyses suggest that each

additional hour of nonsedentary activity (assuming an expenditure of 5 METS during that hour) predicted a 0.015 decrease in body mass index, more than three times that predicted for a 1-hour reduction in time spent watching TV/VCR (0.005). These analyses indicate that change in nonsedentary activity level had an independent and greater effect on change in body mass index than change in time spent watching TV/VCR. These findings are consistent with those found cross-sectionally and prospectively by others. In the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, prevalence of overweight was inversely related to physical activity level.<sup>34</sup> In the NHANES I Epidemiologic Follow-Up Study, recreational physical activity was inversely associated with body mass index, average 10-year weight change, and risk of developing clinical overweight; prospectively, change in activity level was inversely related to change in weight. These findings suggest that low physical activity is both a cause and a consequence of weight gain.<sup>35</sup>

Within the Health Professionals Follow-Up Study, time spent watching TV/VCR, as a measure of sedentary activity, was positively associated with overweight cross-sectionally and prospectively, even when analyses were adjusted for level of nonsedentary activity. The cohort of men surveyed watched, on average, only a quarter to a third the amount of TV in 1988 as men aged 35 years and older who were included in the Nielsen rating estimates for 1989.<sup>17</sup> Nonetheless, odds ratios for overweight were slightly higher than those found by Tucker and Friedman in their cross-sectional study of obesity in adult males.<sup>18</sup>

The relationship between TV/VCR viewing and risk of overweight may have been observed for several reasons. TV/VCR viewing may be associated with caloric intake; that is, time spent watching TV/VCR may be a measure of both inactivity and caloric intake. Numerous food cues appear in prime time programming and commercial advertisements.<sup>36,37</sup> Such cues have been correlated with eating patterns in children and may exert a greater influence in the obese.<sup>38-40</sup> In addition, individuals often eat while watching TV but may be less inclined to eat while involved in other types of sedentary activity. Thus, TV viewing may result not only in inactivity but also in increased food intake. Future investigations should examine the role that eating behaviors

may play in influencing the TV-overweight relationship.

Television viewing may also be associated with overweight because it results in lower energy expenditure, particularly when compared with other types of sedentary activity. Ainsworth et al. indicate that the energy cost of sitting and watching TV is nearly comparable to that of activities done while reclining and is lower than that for other sedentary activities such as sewing, playing board games, reading, writing, and driving a car.<sup>41</sup> This may be partly owing to the "fidgeting" or other spontaneous physical activity that is more likely to occur with some sedentary activities but not with TV viewing.<sup>42</sup> Metabolic rate and observed movements in children have been found to be lower while watching TV than when at rest.<sup>43,44</sup>

Within the current study, the magnitude of associations between activity level and overweight in cross-sectional analyses was greater than that observed in prospective analyses. This might have been because the prevalence of overweight in the cohort (19%) was greater than the cumulative incidence of overweight (approximately 5%) in the 2-year interval. The prevalent cases of overweight accumulated excess weight over decades. Thus, men with prevalent overweight were heavier than men who became overweight only during the 2 years of follow-up. Mean body mass index among prevalent cases of overweight in 1988 was 30.4 while mean body mass index among incident cases of overweight in 1990 was 28.7. Also, in the cross-sectional analyses, there may have been a coincident measure of cause and effect. That is, the effect of overweight on activity level was simultaneously measured with the effect of activity level on overweight, a problem not encountered in the prospective analyses.

The average level of nonsedentary activity in the cohort was high, possibly because the cohort members were all health professionals and self-selected into the study. Their education, income, and occupation likely led them to engage in healthier behaviors (e.g., higher levels of nonsedentary activity and lower levels of sedentary activity) than would be expected in the general American male population. In addition, because information concerning intensity at which nonsedentary activities were performed was not collected from respondents, METS assigned to activities may have overestimated the intensity level at which each activity was actually performed and subse-

quently led to an overestimate of the total nonsedentary activity level. These sources of bias may limit the generalizability of prevalence rates of activity and overweight but not the validity of the relationship between activity and overweight.

The major strengths of the current study are its prospective design and its use of a quantitative measure of nonsedentary activity that accounted for the type and duration of different nonsedentary activities, as well as its assessment of a sedentary activity level.

The process of weight maintenance involves balancing energy intake with energy expenditure. Support of this physiological process comes from engaging in certain eating and activity behaviors—that is, patterns of dietary intake and composition as well as physical activity. When the energy balance is disturbed, it is assumed that these volitional behaviors can be modified to prevent or reverse weight gain. Effective treatment of weight gain occurs primarily by limiting dietary energy intake to impose the requisite caloric deficit necessary to achieve weight loss. Increases in physical activity alone are usually not sufficient to promote weight loss because exercise cannot be sustained at a high enough intensity for a long enough duration of time to achieve the necessary caloric deficit. Consistent with other studies, the current study suggests that physical activity plays a role in preventing weight gain rather than in promoting weight loss. More importantly, it suggests that attention should be focused on the role physical activity can play in preventing small insidious increases in body weight from occurring. While such increases in body weight from one year to the next may appear insignificant, when accumulated over decades they present a serious health risk for many other chronic diseases.

Given the findings in the current study, members of the general public should be encouraged to increase their activity level and decrease their time spent being sedentary. Alone or in combination, these two behavioral changes are important for effective weight control. Health benefits can be gained not only from engaging in vigorous activities such as running or jogging, but also from pursuing less strenuous activities such as walking and stair climbing.<sup>45</sup> The most inactive individuals should be encouraged to engage in activities such as walking, which is simple and convenient, carries low risk for injury, and promotes caloric expenditure important for weight loss and



maintenance. This may provide one of the most efficacious exercise strategies for weight control, especially when combined with a reduction in television viewing time. □

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